

Enabling Tethered Exploration on Mars, Phase I

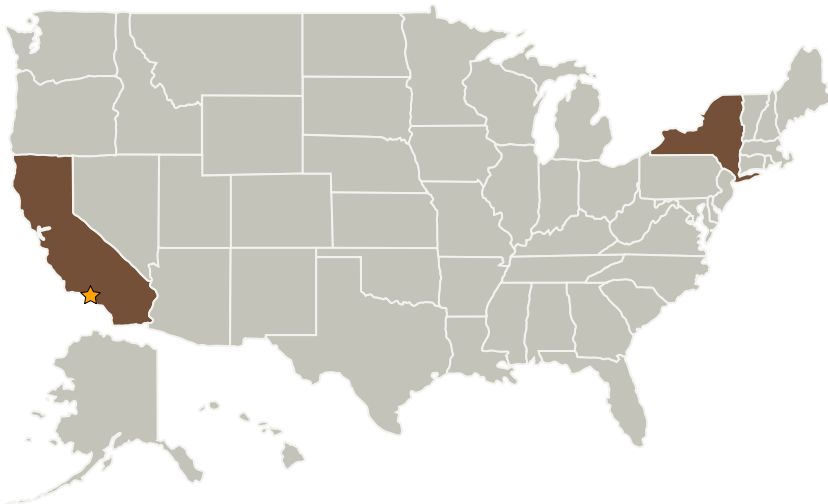
Completed Technology Project (2008 - 2008)



Project Introduction

Strong science motivations exist for exploring hard to reach terrain on Mars and the leading systems proposed to do so require tethers. While tethers are used extensively in terrestrial fields, much research and development must take place to better assess their use for landed Mars missions and to raise the Technology Readiness Level of the solution. Many different technologies will need to be developed and carefully integrated to meet the goal of producing a capable, fault resistant system. We intend to begin creating a body of work which will directly impact the development of a tether system usable for exploration of extreme terrain on Mars. The three R&D areas begin with the highest priority: (1) Tether design: Low volume & mass tether that transmits power, data & structural loads while sustaining environments. (2) Spool design: Reliable, flight relevant spooling mechanism. (3) Increased system intelligence & reliability: Controls approaches for tethered vehicle operations; Sensing tension & dynamic length; Maintaining 3d position knowledge of tether in terrain; Considerations for later work towards fault diagnosis & recovery.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
The Manufactory, LLC	Supporting Organization	Industry	Brooklyn, New York

Primary U.S. Work Locations

California	New York
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Paul O Bartlett

Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.4 Advanced Propulsion
 - └ TX01.4.2 Electromagnetic Tethers